

## GSA FIRE SAFETY & ENVIRONMENTAL SURVEY REPORT

<b>FACILITY NAME</b> U.S. Customhouse	<b>FACILITY ADDRESS</b> 220 NW Eighth Avenue Portland, OR	<b>BUILDING NUMBER</b> OR0025ZZ
	<b>CONDUCTED BY</b> Richard L. Klinker, PE Klinker and Associates, Inc. David Lesch, Certified Industrial Hygienist	<b>DATE OF SURVEY</b>  August 30, 2004
<b>DATE OF REPORT</b>	<b>REPORT CONTROL NUMBER</b>	

**RAC 1, 2 or 3 Findings:** No new findings

**Minor Findings - RAC 4 & 5:** No new findings

**Special Concerns:** None

**GSA FIRE SAFETY & ENVIRONMENTAL SURVEY REPORT**  
**U.S. Customhouse**  
**Portland, OR**

**Introduction**

The purpose of this survey is to identify, through evaluation of administrative records, site inspection, testing of fire protection equipment and recognized methods of measurement, sampling, and monitoring, potential fire safety and/or environmental hazards that are or could be encountered in the facility. This report explains what is required to eliminate or reduce the risk of injury/illness and/or property damage or loss by means of engineering controls or administrative controls.

**Facility Information**

This three and four story building with basement was constructed in 1898 and remodeled in 1977. The building is occupied for offices on all floors, except the fourth floor and half of the third floor are vacant. The Corps of Engineers, which occupies most of the building is scheduled to relocate into a new building in December 2004. There is a snack bar in the basement and a small computer room on the first floor. The Corps of Engineers also has a communications room in the basement. The basement is used for storage, three offices, machine rooms, a computer room, and the snack bar. The attic is only used for mechanical equipment. Storage is not allowed in the attic. The Corps of Engineers occupies the building on the third floor and below.

Room 309 is presently being used for storage of furniture from the Pioneer Courthouse, while that building is being remodeled.

The major firesafety and life safety problem in the building is the lack of adequate stair separation. This lack of stair separation, results in numerous excessive common paths of travel in the building. A major recommendation from our December 1990 Firesafety report, which suggested either the construction of two additional stairs on the Eighth Street side of the building or complete automatic sprinkler protection of the building, has not been implemented. Common paths of travel occur on the first through fourth floors and vary in distance from 80 feet to 105 feet. The stair separation remoteness factor is 25% of the long diagonal of the building. Inspection, testing and maintenance is lacking for the fire protection systems. Emergency lighting is lacking. Exit signs have no recognized emergency power supply.

**Persons contacted:**

Tenants:

Lessor:     Howard Hebdon, GSA

### **Fire Safety Narrative Summary**

The building construction is Type I - Fire Resistive. Most interior finishes are non-combustible. Approximately 335 Federal government employees work at this location, although the tenant is scheduled to relocate into a new building in December 2004.

Egress from the floors above grade is via Stairs #1 and 2. Stair #1 terminates at the unprotected first floor lobby; however, the entire first floor is now sprinkler protected. Stair #1 serves the first through fourth floors. It has a two-hour fire rated enclosure, with two sets of double 1-1/2 hour fire doors held open electromagnetically on the second and third floors. The stair doors are designed to release upon local smoke detector operation. The smoke detectors are located only on the office side of the stair enclosure.

Stair #2 serves the basement through the fourth floors. The stair has a two-hour fire rated enclosure. Stair #2 discharges onto the basement level into a one-hour fire rated protected corridor which discharges directly to grade. This protected corridor would be two-hour fire rated if one set of basement doors, across the corridor, were 1-1/2 hour "B" labeled, instead of 1 hour fire rated. These 1 hour fire doors are also propped open with wedges, and should be kept in a normally closed position. The entire basement is sprinkler protected.

Stair #3 is an unenclosed stair from the basement to the first floor beneath Stair #1. This stair represents a vertical opening problem. There are no fire doors at the basement or first floors. The basement corridor leading to this stair has a one hour fire rating. A fire door assembly should be installed at the stair on either the basement or first floors.

Automatic sprinkler protection is provided on a wet pipe system for the basement, first floor, attic, and each janitors closet on the other floors. The system has numerous waterflow switches, but most switches do not have inspectors test connections. Since they cannot be tested using the actual flow of water, the waterflow switches are probably not operational. Tamper switches are provided for the OS&Y control valves. The fire department siamese connection is located on the NW Broadway side of the building. There are 5 Central Omega sprinklers in Room B04 at the GSA telephone equipment. These sprinklers have had reliability problems and the sprinklers need to be replaced.

The automatic sprinkler system could not be tested during the survey. A new water supply was provided when the first floor was sprinkler protected. The inspectors test connection could not be located. Inspectors test connections are needed for the automatic sprinkler systems in the basement and on the first floor.

The standpipe system has a 4 inch riser in stair #2 which serves 2-1/2" outlets. 1-1/2" outlets are provided in the corridors. The fire department siamese connection is located on the NW Broadway side of the building.

The fire alarm system for the building has an old Simplex Model 4208 control panel. The system has Class B supervised circuits. Manual stations are located at the stairs and exits. Waterflow and tampers switches are provided for the sprinkler system. Smoke detectors are located in the elevator lobbies and machine rooms. Fixed temperature heat detectors are located in major rooms. Smoke detectors are located near the COE computer room, but are not provided within the remodeled computer room (Room 121). Smoke detectors are also located at the corridor side of stair #1 double doors on the third floor and below. Smoke detectors are located at the elevator lobbies. Operation of a station, detector or waterflow switch should sound all bells in the building, initiate the smoke control system, recall the elevators to the first floor, close stair #1 doors, and notify the central station service. The system has a battery and charger for emergency power. The fire alarm control panel is located in the basement; an annunciator panel is provided in the first floor main lobby. The system utilizes a Silent Knight Model 5104 digital communicator panel to transmit a signal to the central station service.

The Simplex fire alarm control panel has the following alarm initiating zones:

- 1 - Basement
- 2 - First floor
- 3 - Second floor
- 4 - Third floor
- 5 - Third floor smoke detectors
- 6 - Fourth floor
- 7 - Attic smoke detectors
- 8 - Sprinkler B, 1, 2, 3, Outside PBX Room, Tamper
- 9 - Attic sprinklers
- 10 - First floor computer room
- 11 - First floor sprinklers
- 12 - Second floor sprinklers
- 13 - Third floor sprinklers

Only a small percentage of the bells operated when tested during 1999 survey. No tests were performed during this survey.

The smoke detection system in the computer room has a Rixon/Firemark control panel. Smoke detectors are located in the raised floor area and at the underside of the ceiling, and a manual pull station is located at the door. The computer room is significantly smaller than previously noted and there are presently no smoke detectors in the actual computer room. All smoke detectors are located in space presently being used for

offices. The 4 zone system has Class B supervision and is connected into the building fire alarm system. The system does cause power shutdown in the computer room. The computer room is enclosed by glass partitions, however it is sprinkler protected.

Emergency lighting for the stairs and corridors is provided by a two source public utility supply with automatic transfer. This is not recognized as emergency lighting. The provision of emergency lighting is being recommended. Electrically illuminated exit signs are provided to indicate the locations of the stairs and exits. There is no emergency power for the exit signs. The provision of emergency power is being recommended.

Heat for the building is provided by oil or gas fired low pressure steam boilers, which now only operate on gas. The boiler room in the basement is enclosed with concrete block walls with 1-1/2 hour fire doors. Fuel oil was stored in (2) 2,000 gallon tanks located in a brick enclosure. They are now empty and filled with sand.

The elevators have both automatic recall and firemans capture features. The first floor is the primary floor of recall. The basement is the alternate recall level. The elevator telephone is operational, and calls the Federal Protective Service Control Center after normal business hours.

The smoke control system, which is activated upon any fire alarm signal, causes the supply air fans to shut down and the dampers to change position to help exhaust smoke from the building. There are no manual override features. The system has only marginal value.

Fire extinguishers are not being maintained satisfactorily. The multi-purpose dry chemical units were last given annual service in March 1994. The fire extinguishers need to be properly inspected, tested and maintained.

Fire exposures are of little concern, the nearest building is approximately 100 feet away. Fire hydrants are located throughout the area. The City of Portland has an Insurance Services Organization rating of 2.

A completed copy of NFPA 101A has been attached; the level of firesafety of this building is not equivalent to the life safety requirements prescribed by NFPA 101 for general purpose buildings. The equivalency could be met if the remainder of the building were sprinkler protected.

In summary, safe egress is not satisfactory due to the excessive common paths of travel in the building, and the unenclosed vertical opening at the basement level, first floor and fourth floor. The building fire alarm system was installed in 1979, but the wiring has been a nightmare. The system does not monitor for

ground fault, utilizes circuits no longer considered acceptable by the fire alarm code, and is old enough that replacement parts are difficult to procure. GSA should plan a repair & alteration project to replace this fire alarm system in the near future.

A previous Firesafety Survey Report of December, 1990, indicated 3 recommended improvements. The status of each item is listed below:

- 001 Finding: The stairs have inadequate remoteness, and excessive common paths of travel are realized on the first through 4th floors.  
Recommendation: Provide additional stairs on the Eighth Street wings of the building, or extend the present stair enclosures to provide a separation distance of 2/3 the long rectangular dimension of the building and reduce the common paths of travel, or provide automatic sprinkler protection throughout the remainder of the building.  
Status: No change.
- 003 Finding: Stair #3 (basement to first floor) is not enclosed with fire rated materials and represents a vertical opening.  
Recommendation: Provide a one hour fire rated door assembly at the first floor or the basement for stair #3. An alternative is to maintain the existing basement fire rated separation for this stair, by maintaining the 1 hour fire rated corridor. This can be done by moving the mail distribution area, photocopy machine, and the storage from the corridor. Signs should be posted to prevent tenants from using the corridor as a storage space.  
Status: No change.
- 005 Finding: Tenant storage in the basement storage room (B-11) is located within 18" of the automatic sprinklers.  
Recommendation: Relocate storage in basement storage rooms so that there is at least 18" clearance below the sprinklers. The top portion of the shelving units should be removed.  
Status: No change, shelving not modified.

There were two firesafety recommendations in the report of September 2, 1993. The status of each item is listed below:

- 001 Finding: The ABC dry chemical fire extinguishers have not recently had 6 year maintenance (units new in 1986).  
Recommendation: Provide 6 year maintenance for fire extinguishers or replace the 1986 units with new fire extinguishers.  
Status: No change; the last annual service was provided in March 1994.

- 002 Finding: The existing fire alarm system is operable, however, it was new in 1979, no wiring diagrams can be located, and the panel wiring is a complete mess.  
Recommendation: Prepare a scope of work, for a Repair and Alteration Project, to replace the existing fire alarm system with a system which meets current GSA criteria for operation and reliability.  
Status: Not implemented; there were major problems with the system when tested during previous surveys.

There were two firesafety recommendations in the 1999 report.  
The status of each item is listed below:

- 001 Finding: There is no emergency lighting in the building.  
Recommendation: Provide emergency lighting in the corridors and stairs.  
Status: Not implemented
- 002 Finding: There is no emergency power supply for the exit signs or their circuits.  
Recommendation: Provide an emergency power supply for each exit sign or for the exit sign circuits.  
Status: Not implemented
- 003 Finding: Maintain and test all fire protection systems so that they are operational.  
Recommendation: Test and maintain the fire protection systems so that they are operational. This includes maintaining the fire alarm system in accordance with NFPA 72; the automatic sprinkler system in accordance with NFPA 25; the exit signs and emergency lights in accordance with NFPA 101.  
Status: Not implemented
- 004 Finding: There is no smoke detection in the first floor COE computer room.  
Recommendation: Modify the smoke detection at the first floor computer room so that a smoke detector is located within the computer room enclosure.  
Status: Not implemented
- 005 Finding: Provide automatic sprinkler protection in the presently unprotected rooms in the basement.  
Recommendation: Provide automatic sprinkler protection in the basement switchgear room and the elevator machinery room (B27A).
- 006 Finding: Five Central Omega sprinklers are located at the GSA telephone equipment in the basement. These sprinklers have been unreliable and are no longer manufactured.  
Recommendation: Replace the five central Omega sprinklers at the GSA telephone equipment room in the basement with reliable sprinklers.

007 Finding: There are smoke detectors at the double doors used as an enclosure for Stair #1 on each floor on only one side of the door.

Recommendation: Provide a smoke detector on the elevator lobby side of double fire doors at the wings on each floor.

Status: Not implemented; the smoke detectors in the elevator lobby are too far from the doors to perform this function.

008 Finding: There are smoke detectors at the elevator lobbies on each floor, but most are wall-mounted and located about three feet below the ceiling.

Recommendation: Relocate the existing wall-mounted smoke detectors so that they are at least 4" and less than 12" below the ceiling.

All of the above remain outstanding open items which need to be implemented.

### FIRE SAFETY SURVEY WORKSHEET

1. Building name, address, and number:  
U.S. CUSTOMHOUSE (OR0025ZZ)  
220 NORTHWEST EIGHTH AVENUE  
PORTLAND, OR
2. Number of Stories Above and Below Grade:  
Above: 4 + Attic  
Below: 1
3. Lease Expiration Date: Not applicable  
Building Construction Date: 1898
4. Date of Previous Survey: February 4, 1999
5. Floors on Which Government Occupies Space: All floors
6. Types of Occupancy Groups  
(I & II) Offices: B-3  
(II) Cafeteria: B  
(II) Computer Rooms: B,1  
(III) Storage: B  
(I) Vacant - 4<sup>th</sup> floor and half of third floor
7. Approximate Gross Area Per Floor: 23,600 SF
8. Number of Federal Occupants: 335
9. Type of Building Construction: Type I
10. Type of Floor Construction: Reinforced concrete
11. Type of Exterior Walls: Brick faced; Granite
12. Type of Roof Construction: Reinforced concrete; Slate
13. Ceiling Finish: Plaster; Spline type acoustical tile
14. Wall Finish: Gypsumboard; Plaster
15. Floor Finish: Carpet; Terrazzo; Vinyl tile
16. Partition Construction: Plaster
17. Location and Size of Group II, III & IV Occupancies:  
Group III - basement storage; group II - most of the  
building due to relatively high fuel loading in offices.
18. Location and Construction of Occupancy Separation or Fire  
Walls: None
19. Automatic Sprinkler System: Wet pipe system

Location: Throughout basement (except the switchgear room), throughout the first floor, and the attic, and in janitors closet on each floor

Spacing: Ordinary hazard (Basement and attic); Light hazard on the first floor, which has an abundance of sidewall heads

Hydraulics: Pipe schedule

Fire Department Siamese Connection: NW Broadway side of building

Waterflow Switches: Connected to building fire alarm system

Tamper Switches: Connected to building fire alarm system

20. Standpipe System: Only for stair #2, and corridors  
Riser Size: 4" (Stair #2)  
Outlet Size: 2-1/2" (Stair #2); 1-1/2" (Corridors)  
Outlet Hose: None  
Fire Department Siamese Connection: NW Broadway side of building  
Waterflow Switches: None provided  
Tamper Switches: None provided
21. Special Fire Extinguishing Systems: None
22. Fire Pump: None
23. Water Supply: Public and not tested, but static pressure 82-85 psi.
24. Fire Alarm/Communication System:
  - a. Type of Fire Alarm System: General; non-coded
  - b. Supervision of Initiating Device Circuits: Class B
  - c. Supervision of Indicating Appliance Circuits: Class B
  - d. Connection to Fire Department: No  
Connection to Central Station: Yes; Alarm Central Station
  - e. Initiating Devices: Manual stations at stairs and exit doors, smoke detectors in elevator lobbies and attic elevator machine rooms, sprinkler flow switches, duct smoke detectors (down stream side of each fan), heat detectors throughout building, smoke detectors: on the floors in the corridors adjacent to stair doors, in attic and in 1st floor computer room
  - f. Indicating Devices: Bells
  - g. Emergency Telephone System: No
  - h. Fire Department Communication System: No

- I. Secondary Source of Power: Battery and charger
  - j. Emergency Control Center: None
25. Exit Considerations:
- a. Exit Capacity: Stair #1 - 120 inches = 400 persons  
Stair #2 - 41 inches = 136 persons
  - b. Exit Remoteness: Stairs are 56 feet apart (23% remoteness)
  - c. Exit Access: Open plan office space, aisles, and corridors
  - d. Exit Enclosure: Stairs are enclosed with masonry walls with 1-1/2 hour fire rating
  - e. Exit Discharge Protection: Exit into entrance lobby (Stair #1); Exit into partially protected corridor (Stair #2)
  - f. Step Dimensions: 6.0-7.25" riser, 11.75-12.5" tread
  - g. Exit Time Calculations: The building should be able to be evacuated within 4.7 minutes according to the calculations
26. Emergency Lighting:
- Type: Battery powered units in a few rooms; No emergency lighting in other areas
- Locations: Rooms B20, B11, B07, B04 only
27. Exit Signs: Indicate location of all exit stairs and exits
- Secondary Source of Power: None
28. Emergency Generator: None; Although, immediate automatic transferring from Portland Gas and Electric (PGE) to Pacific Power and Light (PPL) upon power failure.
29. Building Heat Source:
- Type: Oil or gas fired low pressure steam boilers
- Location: Basement
- Enclosure: Concrete block walls with 1-1/2 hour fire doors
- Fuel Oil Tank: Two, 2,000 gallon tanks in brick enclosure with sand fill (B06)
30. HVAC System:
- Source of Heat: Boiler
- Source of Chilled Water: Cooling tower
- Location of Fans: Basement
- Fire Dampers: In supply and return air ducts

Return Air Routing: Thru corridors; plenum space above ceilings; and some thru ducts

31. Elevator Features:  
Number: 2 passenger; 1 freight (hydraulic; Basement to loading dock)  
Firemans Capture: Yes  
Automatic Recall: Yes, smoke detectors located at each elevator lobby. Automatic recall on any fire alarm  
Certificate Date: Unknown  
Telephone in Cab: Yes
32. Security and Spacing of Exposure Building: No buildings within 100 feet
33. Occupant Emergency Organization: Formed and plan is current
34. Local Fire Department Pre-Fire Plan: The fire department is familiar with the building and has a pre-fire plan.
35. Smoke Control: Automatic smoke removal system upon any fire alarm signal. All supply air is shutdown and dampers change position to exhaust entire building. No manual override.
36. Fire Extinguishers:  
Types: Multi-purpose dry chemical  
Annual Service Date: March 1994; United Fire & Safety Equipment Co.  
Six-year Service Date: None  
Hydrostatic Test Date: New in 1994
37. Maintenance of Firesafety Equipment: Not Satisfactory for fire alarm, fire extinguishers, automatic sprinklers, smoke detectors
38. Results of Operational Tests of Firesafety Equipment: No tests during survey
39. Fire Protection Devices Tested:  
Emergency lighting devices in scattered locations  
Exit signs in scattered locations

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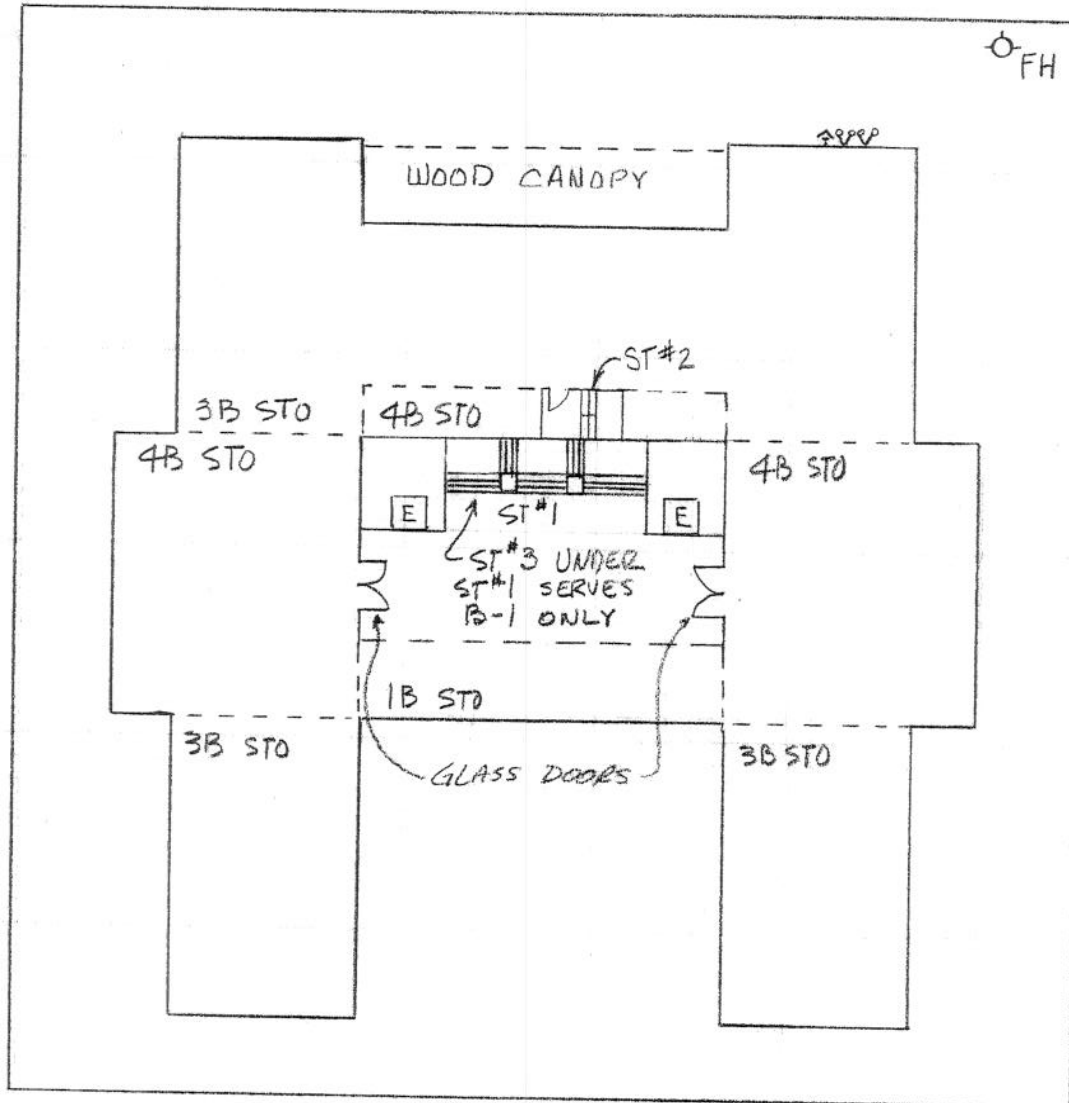
NW BROADWAY

FH

FH

EVERETT STREET

DAVIS STREET



NW EIGHTH STREET

FH

U.S. CUSTOM HOUSE  
220 NW EIGHTH ST.  
PORTLAND, OR  
SCALE: 1"=40'

FIGURE 8.6 Worksheets for evaluating fire safety in business occupancies.

WORKSHEET 8.6.1 COVER SHEET									
Fire Safety Evaluation Worksheet for Business Occupancies									
Facility Identification		<u>U.S. Customhouse</u>							
Evaluator		<u>R L Klinker</u>				Date <u>August 30, 2004</u>			
Notes:									

WORKSHEET 8.6.2 SAFETY PARAMETERS									
Safety Parameters	Parameter Values								
1. Construction	Noncombustible						Combustible		
NFPA 220 Bldg. Constr. Types	Type I (443) or (332) Type II(222)	Type II (111)	Type II (000)	Type III (211)	Type III (200)	Type IV (2HH)	Type V (111)	Type V (000)	
1 Story	0	0	0	0	-1	0	0	-1	
2 Stories	2	2	-4	0	-2	0	0	-4	
3 Stories	2	2	-6	0	-6	0	0	-12	
4-5 Stories but ≤75 ft	<u>2</u>	2	-10	0	-12	0	-3	-12	
>5 Stories but ≤75 ft	2	2	NV	0	NV	0	-6	NV	
>75 ft but <150 ft	2	-1	NV	0	NV	0	NV	NV	
≥150 ft	2	NV	NV	0	NV	0	NV	NV	
2. Segregation of Hazards	Exposed Exit System			Segregation from Exit Routes			None or No Deficiencies		
	Double Def.	Single Def.		Double Def.	Single Def.				
	-7	-4		-4	0		<u>0</u>		
3. Vertical Openings <sup>a</sup>	Open (or incomplete enclosure)					Enclosed			
	Connects 5 or More Floors	4 Flrs.	3 Flrs.	2 Flrs.	<30 min	30 min to 1 hr	>1 hr <sup>g</sup>		
	-10	-7	-4	-2	<u>-1</u>	0	1		
4. Sprinklers	<u>Partial</u> None <u>0</u>	Corridors Only	All but Corridors and Lobbies			Total Building			
		0	Standard	Fast Resp.	Standard	Fast Resp.			
			4	6	10	12			
5. Fire Alarm	None		W/O Fire Department Notification			W/Fire Department Notification			
			W/O Voice Commun.		W/ Voice Commun.	W/O Voice Commun.		W/ Voice Commun.	
	0 (-2) <sup>l</sup>		1(0) <sup>l</sup> (-1) <sup>p</sup>		2(0) <sup>p</sup>	<u>2</u> (1) <sup>l</sup> (-1) <sup>p</sup>		4(2) <sup>p</sup>	

Worksheet 8.6.2 continues.

(For use with NFPA 101A-2001/NFPA 101-2000)

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FIGURE 8.6 Continued

Worksheet 8.6.2 Continued						
6. Smoke Detection	None 0		Corridor 1	Rooms 2	Total Bldg. (zone) 4	
7. Interior Finish	Flame-Spread Ratings <sup>b</sup>					
Exit Routes	>75 to ≤200		>25 to ≤75		≤2	
Rooms/Suites	>75 to ≤200	≤75	>75 to ≤200	≤75	>25 to ≤200	≤25
	-3	-1	0	1	1	2
8. Smoke Control	None 0		Passive 3		Active 4(3) <sup>k</sup>	
9. Exit Access	Max. Dead Ends		No Dead End >50 ft and Travel Is			
	>75 ft to ≤100 ft	>50 ft (20 ft) <sup>h</sup> to ≤75 ft	>200 ft <sup>c</sup> to <400 ft	>100 ft to 200 ft <sup>c</sup>	>50 ft to 100 ft	≤50 ft
	-2 <sup>i</sup>	-1	-1	0	1	3
10. Egress Route	Single		Multiple Routes			
	Deficient		Not Deficient	Smokeproof Enclosures	Direct Exits	
	-6(0) <sup>j</sup>		-2	0	3	5
11. Corridor/Room Separation (compartmentation)	Separation Exists and Level of Protection Is					No Separation, or Single Tenant, or Parameter 4 Value ≥10
	Smoke Resistive <sup>e</sup>		≥½ hr <sup>e</sup>		≥1 hr <sup>e</sup>	
	Incomplete	W/O Door Closer	W/Door Closer	W/O Door Closer	W/Door Closer	
	-6 to 0 <sup>m</sup>	0	1(2) <sup>f</sup>	1	2(3) <sup>f</sup>	
					3(4) <sup>f</sup>	3
12. Occupant Emergency Program	Number of Fire Drills Conducted Per Year					
	0		1 to 2		>2	
	-2(-3) <sup>n</sup>		0(1) <sup>o</sup>		1(2) <sup>n</sup>	

## NOTES:

NV – Where these conditions exist, this FSES does not evaluate overall safety. Other analysis techniques shall be permitted to be applied in accordance with the equivalency concept of Section 1.5 of NFPA 101, *Life Safety Code*.

<sup>a</sup> Use 0 if building is one level.

<sup>b</sup> In any sprinkler-protected spaces, consider flame-spread rating to be 25 or 75 if the interior finish material flame spread does not exceed 75 or 200, respectively.

<sup>c</sup> Increase 200 to 300 if Parameter 4 is 10 or more.

<sup>d</sup> Use 0 if Parameter 11 is -6.

<sup>e</sup> Rate separation as ½ hr (or use actual separation, if greater) if Parameter 4 is 10 or more. Rate separation as "smoke resistive" if Parameter 1 is based on construction Type II(000), III(200), or V(000) and Parameter 4 value < 10.

<sup>f</sup> Use ( ) if separation between rooms also meets criteria.

<sup>g</sup> Use only if all vertical openings have more than 1-hr enclosure and meet the requirements of 7.1.3 and 38.3.1 or 39.3.1 (NFPA 101).

For SI units: 1 ft = 0.348 m.

<sup>h</sup> Use (20 ft) for new construction and 50 ft for existing buildings.

<sup>j</sup> Use ( ) for single exit in accordance with exceptions to 38.2.4.2 and 39.2.4.2 (NFPA 101).

<sup>k</sup> Use (3) if Parameter 4 value < 10.

<sup>l</sup> Use ( ) for building that has:

(a) ≥2 stories above level of exit discharge, or

(b) Occupant load ≥50 (≥100 in existing buildings) above or below level of exit discharge, or

(c) Total occupant load ≥300 (≥1,000 in existing buildings).

<sup>m</sup> See 8.5.11.1.1 for guidance.

<sup>n</sup> Use ( ) in buildings over 150 ft in height with no formal occupant emergency organization program.

<sup>o</sup> Use ( ) in any building, regardless of height, with a formal occupant emergency organization program.

<sup>p</sup> Use ( ) for new high-rise buildings.

FIGURE 8.6 Continued

## WORKSHEET 8.6.3 INDIVIDUAL SAFETY EVALUATION

Safety Parameters	Fire Control (S <sub>1</sub> )	Egress Provided (S <sub>2</sub> )	General Fire Safety Provided (S <sub>3</sub> )
1. Construction	2	<del>2</del>	2
2. Segregation of Hazards	0	0	0
3. Vertical Openings	-1 + 2 = 0.5	-1	-1
4. Sprinklers	0	+ 2 = 0	0
5. Fire Alarm	2 + 2 = 1	2	2
6. Smoke Detection	+ 2 = 0	0	0
7. Interior Finish	2 + 2 = 1	<del>2</del>	2
8. Smoke Control	<del>2</del>	+ 2 = 0	0
9. Exit Access	<del>2</del>	-2	-2
10. Exit Systems	<del>2</del>	-2	-2
11. Corridor/Room Separation	+ 2 = 0	+ 2 = 0	0
12. Occupant Emergency Program	<del>2</del>	1	1
Total	S <sub>1</sub> = 3.5	S <sub>2</sub> = -1	S <sub>3</sub> = 2

## WORKSHEET 8.6.4 MANDATORY REQUIREMENTS

Building Height	Control Requirement (S <sub>a</sub> )		Egress Requirement (S <sub>b</sub> )		General Fire Safety (S <sub>c</sub> )	
	New	Existing	New	Existing	New	Existing
1 Story	0.5	-1.0	1.5	0	2	-1
2 Stories	-2.5	-4.0	1.5	0	-1	-4
3 Stories	1.5	0	1.5	0	3	0
>3 Stories and ≤75 ft	4.0	2.0	2.5	0	6	2
>75 ft but <150 ft	9.5	7.5	7.5	5	10	6
≥150 ft	12.5	10.5	7.5	5	10	9

(For use with NFPA 101A-2001/NFPA 101-2000)

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FIGURE 8.6 Continued

## WORKSHEET 8.6.5 EQUIVALENCY EVALUATION

						Yes	No
Control Provided ( $S_1$ )	minus	Required Control ( $S_a$ )	$\geq$	0	$S_1 - S_a = 3.5 - 2 = 1.5$	✓	
Egress Provided ( $S_2$ )	minus	Required Egress ( $S_b$ )	$\geq$	0	$S_2 - S_b = -1 - 0 = -1$		✓
General Fire Safety ( $S_3$ )	minus	Required Gen. Fire Safety ( $S_c$ )	$\geq$	0	$S_3 - S_c = 2 - 2 = 0$	✓	

## WORKSHEET 8.6.6 FACILITY FIRE SAFETY REQUIREMENTS WORKSHEET

	Considerations	Met	Not Met	Not Applic.
A.	Building utilities conform to the requirements of Section 9.1.	✓		
B.	The air conditioning, heating, and ventilating systems conform to Section 9.2, except for enclosure of vertical openings, which have been considered in Safety Parameter 3 of Worksheet 8.6.2.	✓		
C.	Elevator installations are made in accordance with the requirements of Section 9.4.	✓		
D.	Rubbish chutes, incinerators, and laundry chutes are installed in accordance with Section 9.5.			✓
E.	Portable fire extinguishers are installed and maintained in accordance with the requirements of 38.3.5/39.3.5 and 9.7.4.1.	✓		
F.	Standpipes are provided in all new high-rise buildings as required by 38.4.2.			✓

All references are to NFPA 101, *Life Safety Code*.

## WORKSHEET 8.6.7 CONCLUSIONS

- ☐ All of the checks in Worksheet 8.6.5 are in the "Yes" column. The level of fire safety is at least equivalent to that prescribed by NFPA 101, *Life Safety Code*, business occupancies.\*
- ☒ One or more of the checks in Worksheet 8.6.5 are in the "No" column. The level of fire safety is not shown by this system to be equivalent to that prescribed by NFPA 101, *Life Safety Code*, for business occupancies.

\* The equivalency covered by this worksheet includes the majority of considerations covered by NFPA 101, *Life Safety Code*. There are some considerations that are not evaluated by this method. These must be considered separately. These additional considerations are covered in Worksheet 8.6.5, Facility Fire Safety Requirements Worksheet. One copy of this worksheet is to be completed for each facility.